

WHAT IS CLAIMED IS:

1. A system for communicating data, comprising:  
a data switch coupled to one or more customer premises equipment (CPE) devices;  
5 the data switch operable to:  
communicate with one or more CPE devices using a first predetermined power spectral density (PSD); and  
communicate with the one or more CPE devices using a second predetermined PSD;  
10 the operability of the switch being provided by software embodied in a computer-readable medium.
2. The system of Claim 1, wherein the switch is further operable to communicate substantially simultaneously with two or more CPE devices using at  
15 least two different PSDs.
3. The system of Claim 1, wherein the switch is further operable to direct a CPE device to communicate with the switch using a particular PSD.
- 20 4. The system of Claim 3, wherein the switch directs the CPE device by communicating to the CPE device control packets containing one or more parameters defining one or more characteristics of the particular PSD.
5. The system of Claim 1, wherein the first predetermined PSD is  
25 substantially optimal for communication across a line coupling the switch with a CPE device, the line experiencing substantially high levels of noise.
6. The system of Claim 1, wherein the first predetermined PSD is  
30 substantially optimal for communication across a line coupling the switch with a CPE device, the line experiencing substantially low levels of noise.

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7. The system of Claim 1, wherein the first predetermined PSD is substantially optimal for communication across a line coupling the switch with a CPE device, the line experiencing substantially high signal attenuation.

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8. The system of Claim 1, wherein the second predetermined PSD complies with at least one public standard.

9. The system of Claim 1, wherein the switch is further operable to communicate with the one or more CPE devices using a high-probability PSD characterized by a substantially high probability of supporting communication and a substantially low bit rate, the high-probability PSD being substantially within the intersection of a plurality of PSDs complying with a plurality of public standards.

10. The system of Claim 9, wherein the switch communicates with the one or more CPE devices using the high-probability PSD to establish a particular PSD for communication between the switch and the one or more CPE devices.

11. The system of Claim 1, wherein the switch is further operable to communicate with the one or more CPE devices using a PSD defined by a network administrator.

12. The system of Claim 1, wherein:  
the switch comprises memory operable to store one or more parameters defining particular characteristics of one or more PSDs; and

the switch is further operable to communicate with the one or more CPE devices using a PSD selected by a network administrator from a list of the PSDs the parameters of which are stored in the memory.

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13. The system of Claim 1, wherein the switch uses frequencies in the very high speed digital subscriber line (VDSL) band.

14. The system of Claim 1, wherein the switch is further operable to  
5 automatically communicate with all of the CPE devices coupled to the switch using a predetermined PSD that complies with at least one public standard in response to a switch administrator setting the switch for operation in a regulated spectra environment.

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15. A method for establishing a desired mode link between a data switch and a customer premises equipment (CPE) device, comprising:

establishing a high-probability mode link between the switch and the CPE device;

5 determining a desired mode for communication between the switch and the CPE device;

directing the CPE device to communicate with the switch using the desired mode;

10 configuring the switch to communicate with the CPE device using the desired mode; and

communicating with the CPE device using the desired mode to establish the desired mode link.

16. The method of Claim 15, wherein the switch uses frequencies in the very high-speed digital subscriber line (VDSL) band.

17. The method of Claim 15, wherein the high-probability mode link is characterized by a substantially high probability of supporting communication and a substantially low bit rate, the high-probability mode link complying substantially with a plurality of public standards.

18. The method of Claim 15, wherein directing the CPE device to communicate with the switch using the desired mode comprises communicating control packets to the CPE device using the high-probability mode link, the control packets containing information reflecting one or more parameters defining the desired mode.

19. The method of Claim 15, wherein configuring the switch to communicate with the CPE device using the desired mode comprises modifying one or more registers to reflect one or more parameters defining the desired mode, the one or more registers being within a physical media controller (PMC) providing an  
5 interface between the switch and the CPE device.

20. The method of Claim 15, wherein the desired mode is substantially optimal for communication across a line coupling the switch with the CPE device, the line experiencing substantially high levels of noise.  
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21. The method of Claim 15, further comprising:  
re-establishing a high-probability mode link between the switch and the CPE device in response to the desired mode link going down;  
re-directing the CPE device to communicate with the switch using the desired  
15 mode;  
reconfiguring the switch to communicate with the CPE device using the desired mode; and  
communicating with the CPE device using the desire mode to reacquire the desired mode link.

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22. A system for communicating data, comprising:

a switch using frequencies in the very high-speed digital subscriber line (VDSL) band coupled to one or more customer premises equipment (CPE) devices; the switch operable to:

5           communicate with one or more CPE devices using a first power spectral density (PSD) complying with at least one public standard;

          communicate with the one or more CPE devices using a plurality of second PSDs, the second PSDs being substantially optimal for communications across lines coupling the switch with the CPE devices;

10           communicate substantially simultaneously with two or more CPE devices using at least two different second PSDs; and

          automatically communicate with all of the CPE devices coupled to the switch using a predetermined PSD that complies with at least one public standard in response to a switch administrator setting the switch for operation  
15           in a regulated spectra environment;

          the operability of the switch being provided by software embodied in a computer-readable medium.

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